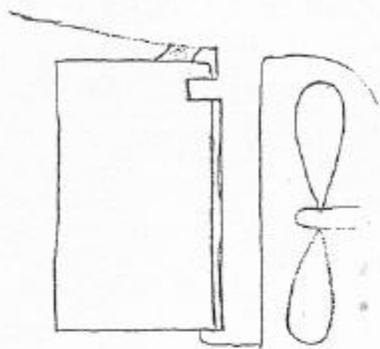




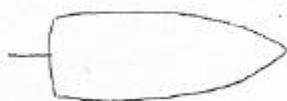
3. Describe a design improvement to alter a simple rudder design (Fig 9.2a) into a semi-balanced rudder.



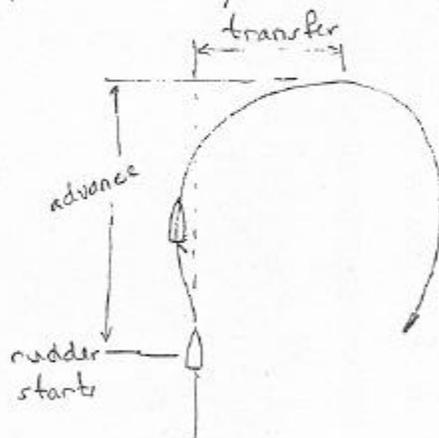
To improve this design, do not hang rudder on rudder post.

Remove rudder post and rudder will be semi-balanced.

4. Sketch stages of a ship's turn. Why does a ship slow in a turn?



prior to course change



rudder lift



rudder force produces turning moment

Ship slows in a turn due to additional resistance from rudder and hull



as ship turns, flow of water also produces lift

